Making Better Decisions About Built Assets: Learning by Doing

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OVERVIEW

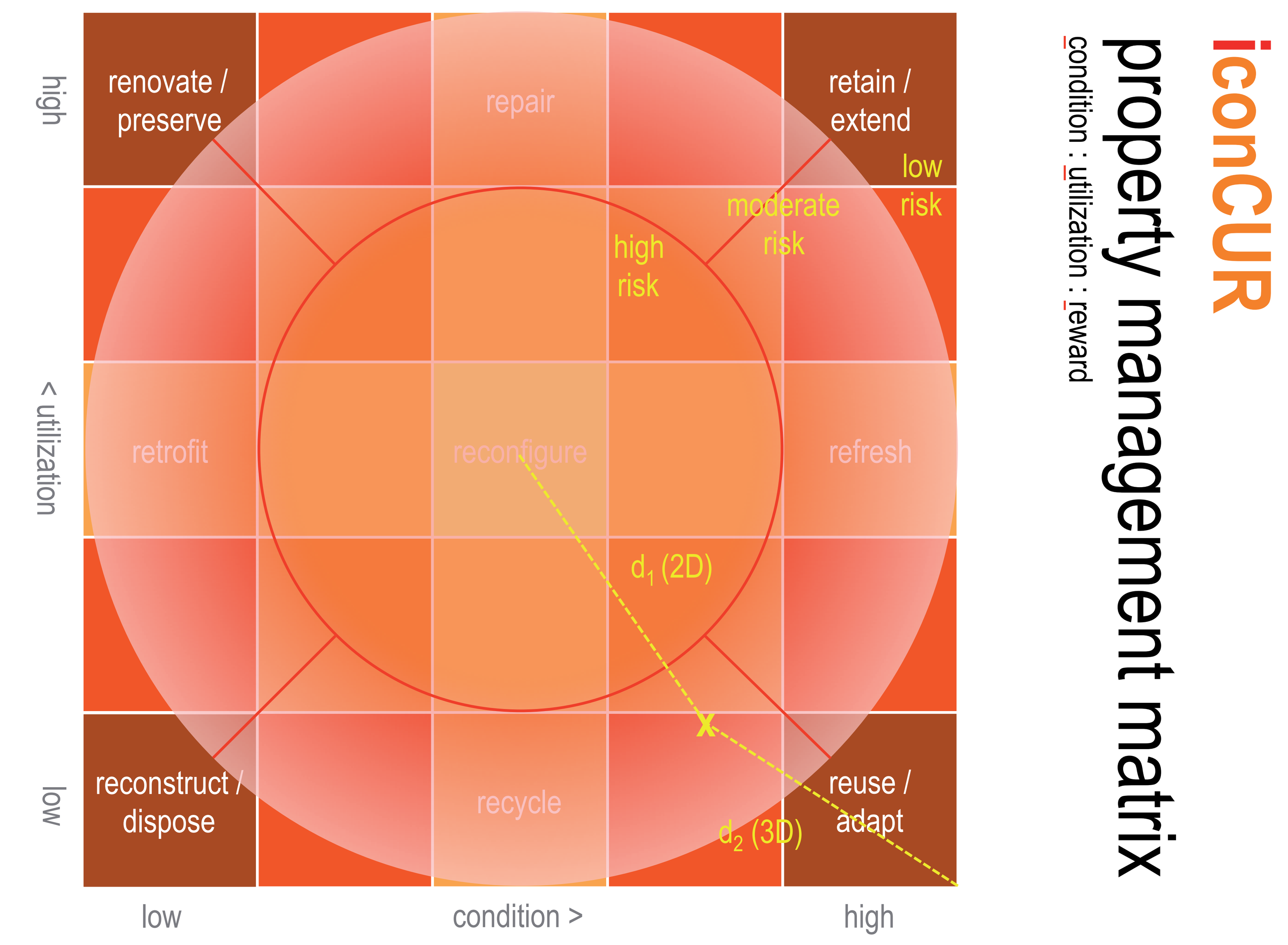
Climate change presents significant challenges to society (e.g. Stern, 2006; Bouwer and Aerts, 2006). Many have concluded that climate change is the most important problem facing humankind, and indeed other life on Earth. The construction industry, which contributes 5-10% of national GDP globally, has a prominent role to play in meeting this challenge given that the built environment demands 40-50% of global resources and generates a proportional amount of waste (Langston and Ding, 2001). Climate change adaptation is about human response to this challenge, thus mitigating the impacts of a changing climate (Burton et al., 2005).

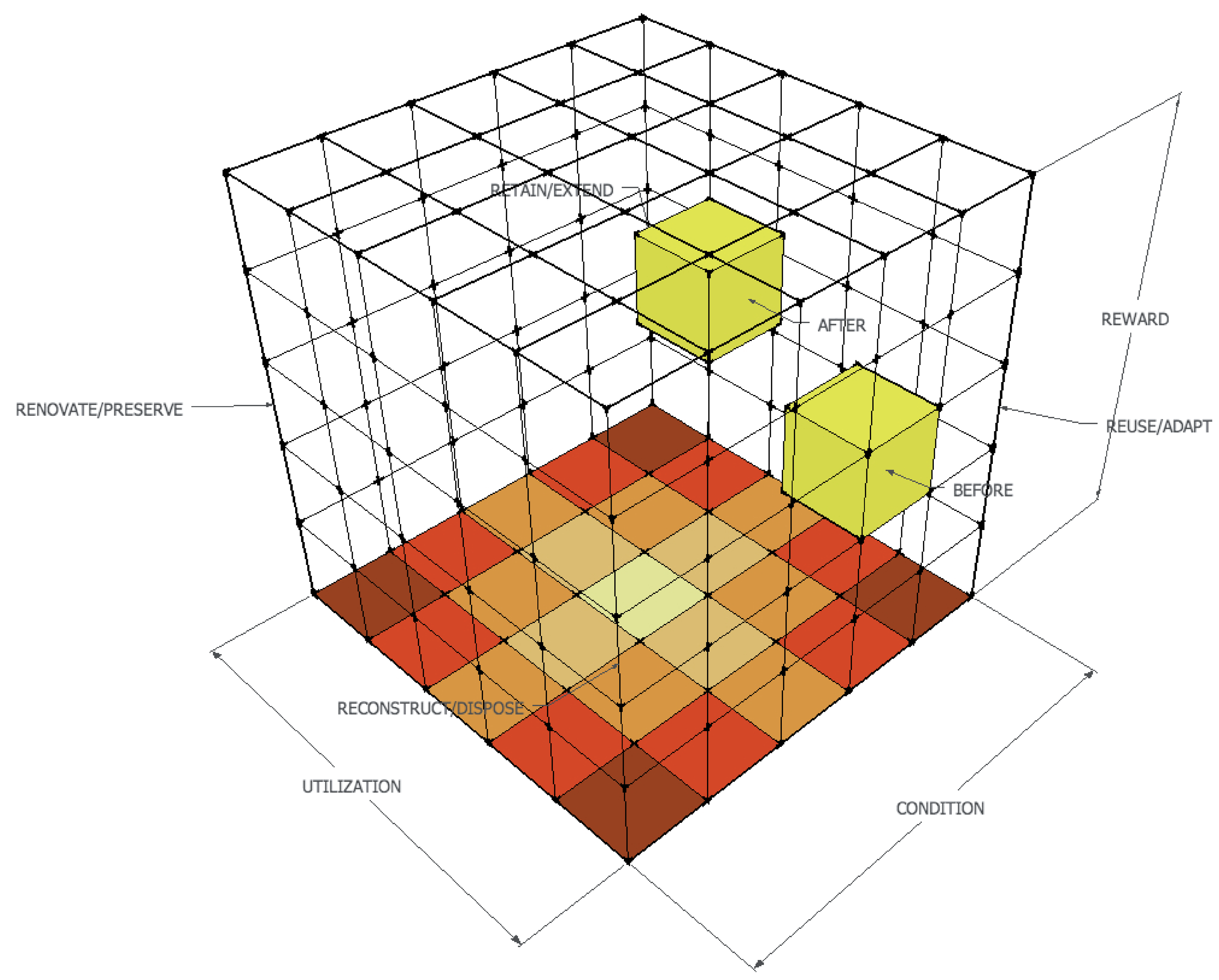
A major contribution that the construction industry can still make is ensuring that decisions about built assets are balanced: feasible, in the national interest and as sustainable as possible. A multi-criteria decision analysis (MCDA) framework is normally advocated (e.g. Mendoza and Martins, 2006; Herath and Prato, 2006). There is a need amongst the built environment professions for a transparent understanding of the goals of multiple stakeholders that underpin optimal decisions. Further, given the uncertainty associated with these choices, there is a need to refine predictions by learning from experience so to improve future decision heuristics.

Adaptive management (AM) is a powerful approach to reducing ecological uncertainty and improving the overall performance of many resource-based systems (Gregory et al., 2006). It has the potential to improve the expected net benefit of specific developmental initiatives. It is sometimes described as “learning by doing”. Recently Linkov et al. (2006) suggested that AM be combined with MCDA to provide structured, clear decisions and allow for refinement of criteria goals and weightings based on feedback regarding actual project performance. Accelerated learning from experience assures that better decisions are made in the future. To our knowledge this combined decision-making methodology has never been applied to physical assets such as buildings and infrastructure. The built environment is a perfect application as assets are long-lived and highly managed, yet ironically the long time frames involved have also been the main obstacle. What is missing to date is an explicit link between initial decisions made when the building was conceptualised, designed and built and subsequent performance throughout its life span, using criteria that reflect economic, social and environmental goals.

Therefore the aims of the research were (1) to construct and disseminate a novel MCDA support model for making better decisions about built assets, (2) to identify and prioritise the parameters that affect sustainable built asset performance, and (3) to review the robustness of past asset decisions in the light of current performance to refine and optimise the tool.

As it is not possible to test new decisions, a retrospective evaluation was adopted. The MCDA support model (named *iconCUR*) enables the key variables of condition, utilization and reward to be measured and mapped in three dimensional space (Langston and Smith, 2012). Property management trends can be plotted over time and assessed by the distance between the property’s current position and optimum decision coordinates. The findings will be of benefit to all construction industry stakeholders and help realize climate change adaptation targets in exisitng building stock without undue lag.





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